recovery fiber 81 is provided for removing excess pump light traveling in the cladding. The recovery fiber is in the form of a loop and redirects the excess pump light back into the main fiber 25 where it can add to the excitation energy of the core, thereby improving the overall efficiency of the system.

In Figure 6a, light is decoupled from the amplifier fiber at a downstream location and reinserted at an upstream location. This embodiment corresponds to claim 4. Claim 23 specifies that the excess pump light is reinserted back into the fiber in a direction opposite to the initial the propagation direction. One example of this concept is shown in the fiber loop 51 of Figure 7d.

Both independent claims 1 and 23 include an amplifier fiber having a doped core surrounded by a cladding and an optical arrangement for inserting pump-light from a source into the cladding of said amplifier fiber such that the pump light propagates in the cladding. In addition both claims include at least one recovery fiber for receiving an unabsorbed portion of the pump light from the cladding and for reinserting the pump light back into the cladding. It is respectfully submitted that none of the cited art teaches this arrangement.

In the Office Action, the Examiner rejected claims 1, 4-8, 12-14 and 23 to 24 based on the patent to Nilsson (6,288,835). The Examiner relied on Figure 19 of Nilsson and the accompanying text beginning at column 32, line 61. In the Office Action, the Examiner asserts that Nilsson Figure 19 discloses a "recovery fiber for receiving an unabsorbed portion of said propagated pump light from said cladding and for re-inserting said unabsorbed portion of said pump-light into said cladding for re-propagation therein." Applicant disagrees.

Figure 19 of Nilsson relates to a fiber laser. In the description of Figure 19, Nilsson uses a few reference numbers associated with Figure 14. More specifically, the laser of Figure 19 includes a doped fiber amplifier which could be in the form of the amplifier of Figure 14. This amplifier is denoted as 1408 in Figure 19. A pump laser 1405 generates pump light 1406 (not shown in Figure 19) which is inserted into the amplifier via fiber 1902. What makes this structure a laser and not an amplifier is that the **excited output** from the fiber, (referred to as optical radiation 1404 and illustrated in Figure 14) is captured as it exits the amplifier 1408 and is reinserted back into the amplifier via the fiber loop, thus defining a ring laser. Laser light is coupled out of the laser using outcoupling fiber 1905.

In Figure 19 of Nilsson, the loop of fiber is configured to capture and reinsert **laser light, not pump light**. This is clear from the Nilsson specification which states that the "optical

feedback device 1901 is configured to ensure that a portion of the optical radiation 1404 guided by the first waveguiding structure 1401 is amplified more than once by any one section of the amplifying region 1407." (Column 32, line 63+)

Nilsson further states that the optical pump power 1406 is launched into the first waveguiding structure 1401 via the wavelength division multiplexing coupler 1902. This enables the **optical radiation 1404** to circulate in a closed loop structure 1910. The closed loop structure 1910 in this example is a laser cavity 1906 that is configured in a ring. (Column, 33, line 6+).

There is no hint or suggestion that Nilsson's fiber loop is intended to receive "an unabsorbed portion of said propagated pump light from said cladding" and reinsert that pump light back "into said cladding" as set forth in independent claim 1 and therefore the rejection based on Nilsson should be withdrawn.

In the Office Action, the Examiner rejected claims 23 and 24 based on the Figure 30 embodiment of Nilsson and the associated specification at column 37, lines 29 to 50. Figure 30 of Nilsson also discloses a fiber laser. Fiber laser includes a fiber amplifier 3008 and a pair of end mirrors 1901. The fiber laser is pumped by a source 1405 through a fiber 1902. Thus, there are only two fibers shown in Figure 30, the fiber amplifier 3008 and the pump input fiber 1902. There are no other fibers in Figure 30 and certainly no disclosure of a recovery fiber for capturing unabsorbed pump light and returning it to the cladding of the fiber. It is therefore respectfully submitted that neither Figure 19 nor Figure 30 of Nilsson teach or suggest the subject matter of claim 23 which requires "a recovery fiber arranged to receive an unabsorbed portion of said propagated pump light from said cladding, and to re-insert said unabsorbed portion of said pump-light into said cladding for re-propagation therein in a second propagation direction opposite to said first propagation direction."

In the Office Action, the Examiner rejected claim 2, relying in addition on Figure 5 of Nilsson. The Examiner relies on Figure 5 to teach the use of reflectors to form a laser cavity. However, claim 2 depends on claim 1 and nowhere in Nilsson is there a teaching or suggestion of the use of a recovery fiber for capturing an unabsorbed portion of the propagated pump light from said cladding and reinserting that light back into the cladding. Accordingly, this rejection must be withdrawn as well.

In the Office Action, the Examiner rejected claim 3 as being obvious based on the patent to Nilsson in view of Masters (3,289,101). The Examiner cited Masters for its alleged teaching of a recovery fiber twisted around the amplification medium. The Examiner referred to Figure 13 of Masters. In Figure 13 of Masters, a laser system is shown with three laser rods 90, 91, and 92. Each of these rods is optically excited by a **helical flashlamp** 93, 94 and 95 respectively. Laser light from the rods is captured by fibers 100, 101 and 102 and directed to an end resonator mirror 106. Coatings on the distal ends of the rods provide the other resonator mirrors. As can be appreciated, Masters fails to teach a recovery fiber much less a recovery fiber wrapped around a gain medium. Accordingly, the patent to Masters fails to overcome the deficiencies of Nilsson in anticipating or rendering claim 3 obvious.

In the Office Action, the Examiner rejected claim 9 as being obvious over Nilsson. However, since claim 9 depends from claim 1 and claim 1 is not rendered obvious by Nilsson, this rejection should be withdrawn.

Claim 10, 11 and 12 were rejected based on combinations of Nilsson, Hecht and Reinhardt. The Hecht reference is merely a textbook chapter on couplers and switches and the Reinhard reference is merely a beginner's text on optical fibers. Neither of these references, taken alone or in combination with Nilsson teach or suggest a fiber amplifier having "at least one recovery fiber for receiving an unabsorbed portion of said propagated pump light from said cladding and for re-inserting said unabsorbed portion of said pump-light into said cladding for re-propagation therein" and therefore claims 10 to 12 contain patentable subject matter as well.

In view of the above, it is respectfully submitted that independent claims 1 and 23 define patentable subject matter and allowance thereof along with the claims depending therefrom is respectfully solicited.

Respectfully submitted,

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